

## ABSTRACT

The present invention provides a process for producing a metal nanoparticle composite film, which is capable of independently  
5 controlling the particle diameter and the volume filling ratio of metal nanoparticles in the metal nanoparticle composite film. The process comprises the steps of (a) treating a polyimide resin film with an alkali aqueous solution to thereby introduce a carboxyl group, (b) bringing the resin film into contact with a solution containing metal ions, to thereby  
10 dope the metal ions in the resin film, and (c) performing thermal reduction treatment in a reducing gas, thereby producing the metal nanoparticle composite film containing the metal nanoparticles dispersed in the polyimide resin film, wherein the volume filling ratio of the metal nanoparticles in the composite film is controlled by regulating the  
15 thickness of a nanoparticle dispersed layer formed in the polyimide resin film with the thermal reduction treatment in the reducing gas in the step (c).